GRAPHING NOTES

8.EE.C.8.A **Expressions & Equations**

Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

I can find the solution to a system of Equations.

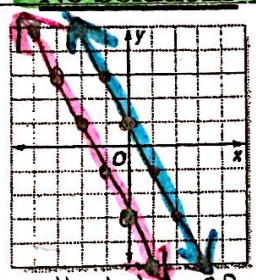
What is a solution?

An ordered pair where the lines of a system intersect. (x, y)

Solutions to a System of Linear Equations

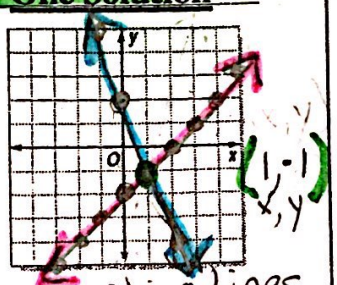
3 Types of Solutions

No Solutions



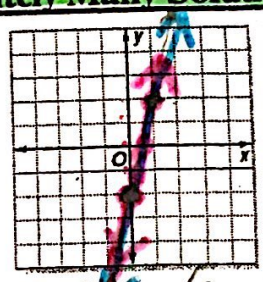
Parallel Lines
- same slope (m)
- different y-int (b)

One Solution



Intersecting Lines
- different slopes (m)
- diff. y-int or same y-int

Infinitely Many Solutions



Same Lines (Coinciding)
- same slope (m)
- same y-int (b)

Determine the # of solutions for the following equations:

$y = mx + b$

1.) $y = -2x + 1$ $m=-2, b=1$
$y = -2x - 3$ $m=-2, b=-3$

same slope (m)
different y-int (b)
↓
Parallel Lines

# of Solutions: none

$y = mx + b$

2.) ~~$2x + y = 5$~~ $-x + y = -2$
$\boxed{y = -3x + 2}$ $m=-3, b=2$

$-x + y = -2$ ← rearrange
$+x \quad +x$

$\boxed{y = 1x - 2}$ $m=1, b=-2$

different slopes (m)
↓
intersecting Lines

# of Solutions: (1, -1)

$y = mx + b$

3.) $\boxed{y = 4x - 2}$ $m=4, b=-2$

$-8x + 2y = -4$ rearrange
$+8x \quad +8x$

$\frac{2y}{2} = \frac{8x}{2} - \frac{4}{2}$

$\boxed{y = 4x - 2}$ $m=4, b=-2$

- same slopes (m)
- same y-int (b)
↓
Same Lines

# of Solutions: inf. many solutions

Tuesday: odds Thursday: Evens

Math 8 Name_____

Introduction to Systems of Equations

Date_____ Period____

Determine if the ordered pair is a solution to the system of equations.

1) $2x + 2y = 10$ → $2(3) + 2(2) = 10$ (x, y)
$6 + 4 = 10$
$10 = 10$ ✓ true

$y = -4x + 14$
$2 = -4(3) + 14$
$2 = -12 + 14$
$\boxed{(3, 2)}$ (x, y)
$2 = 2$ ✓ True

yes, this is a solution

2) $y = x + 4$
$3x + 2y = -22$

(6, 10)

3) $x - 3y = -24$ → $(8) - 3(0) = -24$
$8 - 0 = -24$
$8 = -24$ not true

$2x + 2y = 16$
$2(8) + 2(0) = 16$
$\boxed{(8, 0)}$
$16 + 0 = 16$
$16 = 16$ True

No, not a solution because it doesn't work in both equations.

4) $5x + y = 24$
$4x - 2y = 22$

(5, -1)

3 types

Compare the slopes and y-intercepts of the equations to determine how many solutions each system will have. You may need to arrange one or both of the equations first.

5) $y = 4x + 20$ → $m = 4$ $b = 20$
$y = -3x - 22$ → $m = -3$, $b = -22$

different slopes (m)

different y-int (b)

One Solution

6) $-12x - 2y = -8$
$y = -6x + 3$

7) $y = mx + b$
$\boxed{y = 2x + 17}$ → $m = 2$, $b = 17$

$-2x - 6y = -4$
$+2x$ $+2x$
$\frac{-6y}{-6} = \frac{2x}{-6} - \frac{4}{-6}$

$\boxed{y = -\frac{1}{3}x + \frac{2}{3}}$ → $m = -\frac{1}{3}$, $b = \frac{2}{3}$

different slopes (m)

different y-int (b)

One Solution

8) $-x + 4y = -19$
$x - 4y = 19$